

The incredible graphics machine.



Features ahead of the competition

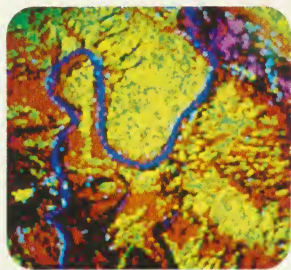


Fig. A

Colors

256 simultaneous colors (full video memory). Select from a palette of 2^{24} . Color assignment table allows you to choose the exact shade, or blink between different colors.

Imaging

Full screen transfers at 0.5 sec./picture via direct video memory access port.

Scroll

Horizontal and vertical scrolling by simultaneously updating video memory while modifying origin registers.

Pan

Display origin registers may be set via joystick or under program control to allow continuous pan at any level of zoom.

Zoom

2:1, 3:1, ..., 15:1, 16:1 independently set horizontally and vertically.

Overlays

8 x 2-color, 4 x 4-color, 2 x 8- plus 1 x 4-color, or 2 x 16-color images may be overlaid from full (8 plane) memory.

Graphic Aids

Vector, circle, filled rectangle and unrestricted polygon (closed curve) fill.

Gray Scale

256 shades with full (8 planes) video memory.

Alphanumeric

5 x 8 pixels (85 characters/line, 48 or 60 lines/page) or 7 x 9 pixels (56 characters/line, 40 lines/page) form 96 displayable characters in any color at any location. Double size characters in either font. Programmable font characters in any size with full color capability.

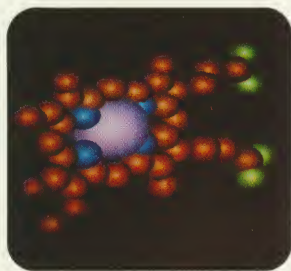


Fig. B

User Definable Symbols

Up to 256 symbols can be defined as raster-graphic overlays, each with its own horizontal and vertical size. They may be moved or erased without disturbing background data, and without requiring more than a minimum of host/terminal communication. (The number of simultaneously-defined symbols is limited only by available microprocessor RAM and depends upon symbol sizes and color complexity.)

Cursor

Symmetrical crosshair may be programmed to a fixed color. Normal cursor axis is 45° off horizontal for improved point selection; however, a vertical crosshair and a variable size rectangular crosshair are also selectable. Selectable blink rate is available between any 2 colors. Cursor position settable/readable by host computer.

Joystick

For selecting data features and objects, colors, panning, and image editing. Absolute (coarse or fine) or rate change are key selectable.

Keyboard

Standard communications format, upper & lower case, 10-key numeric pad, 10 terminal control keys and 8 user-defined function keys for a total of 82 keys. Features include solid state key switches, and typewriter "feel".

Intelligence

A 500 nanosecond 6502A microprocessor controls the terminal and I/O functions, performs character, vector, circle and filled area generation. Emulation of Tektronix 4010 permits running 10-bit PLOT 10*. Terminal has up to 26K byte RAM/ROM memory capacity.

Power

Oblique vector generation at 105K pixels/second. Horizontal lines and rectangle fill at 4 million pixels/second.

Memory

16K Dynamic MOS, organized in M = 1 to 8 picture planes of 512 by 512 bits. Number of available simultaneous colors = 2^M . Number of vectors and length of vectors are not dependent upon amount of optional memory. Write to or read from memory over 8-bit microprocessor bus or through 16-bit byte-unpacking Direct Video Memory Access port.



Fig. C

Masking

Video Memory Plane Write and Read Masks for convenient multiple image or overlay processing. View one image while generating another.

Blink

Any of all of the 256 color values may be given an associated "blink" attribute specifying blink rate and "blink to" color, allowing foreground objects to blink upon an arbitrary background.

Addressable

Single points may be accessed by keyboard, host, or joystick.

Data I/O

DMA interfaces to popular mini- and microcomputers are available, allowing byte or 16-bit word parallel transfers at 500K bytes or words/second.

Communications

Either RS232C or 20 ma. current loop; rates to 19,200 baud. An additional RS232C serial interface is included and will drive printer, plotter or graphic digitizer.

Compatibility

Emulates Tektronix storage terminals, with upward-compatible color selection. By ignoring the least significant bit, 10-bit PLOT 10 (1024H x 780V) is processed and displayed as 512 x 390 pixels. (1024 x 780 employing Superoam available soon).

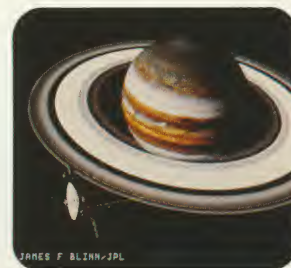


Fig. D

Video Output

Separate Red, Green and Blue outputs on back panel are composite video and sync in RS170 format. Monochrome output of least significant memory plane allows operator interaction in normal or reverse video on a separate monitor without disturbing color display. All video outputs will drive multiple monitors or video hard copy devices.

Video Monitors

Color: 13- or 19-inch slotted-mask color monitor is standard. All monitors provided by AED are attractively packaged, integrated, and fitted with flicker-suppressing screen filters.

Resolution

512 horizontal by 483 vertical (standard), or 512 by 512 (optional).

Refresh

60 fields/second, 2:1 interlaced.

Modular

The base cabinet, including electronics, I/O ports, keyboards and joystick may be purchased exclusive of the video monitor. A customer-supplied monitor can sit conveniently on top of a base cabinet in proper relationship to console or be remoted from the controller.

Reliability

All electronics except the keyboard and joystick are mounted on a single printed circuit board.

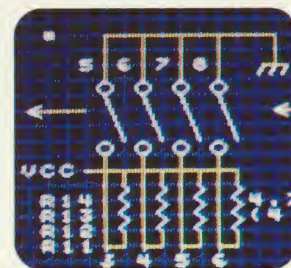


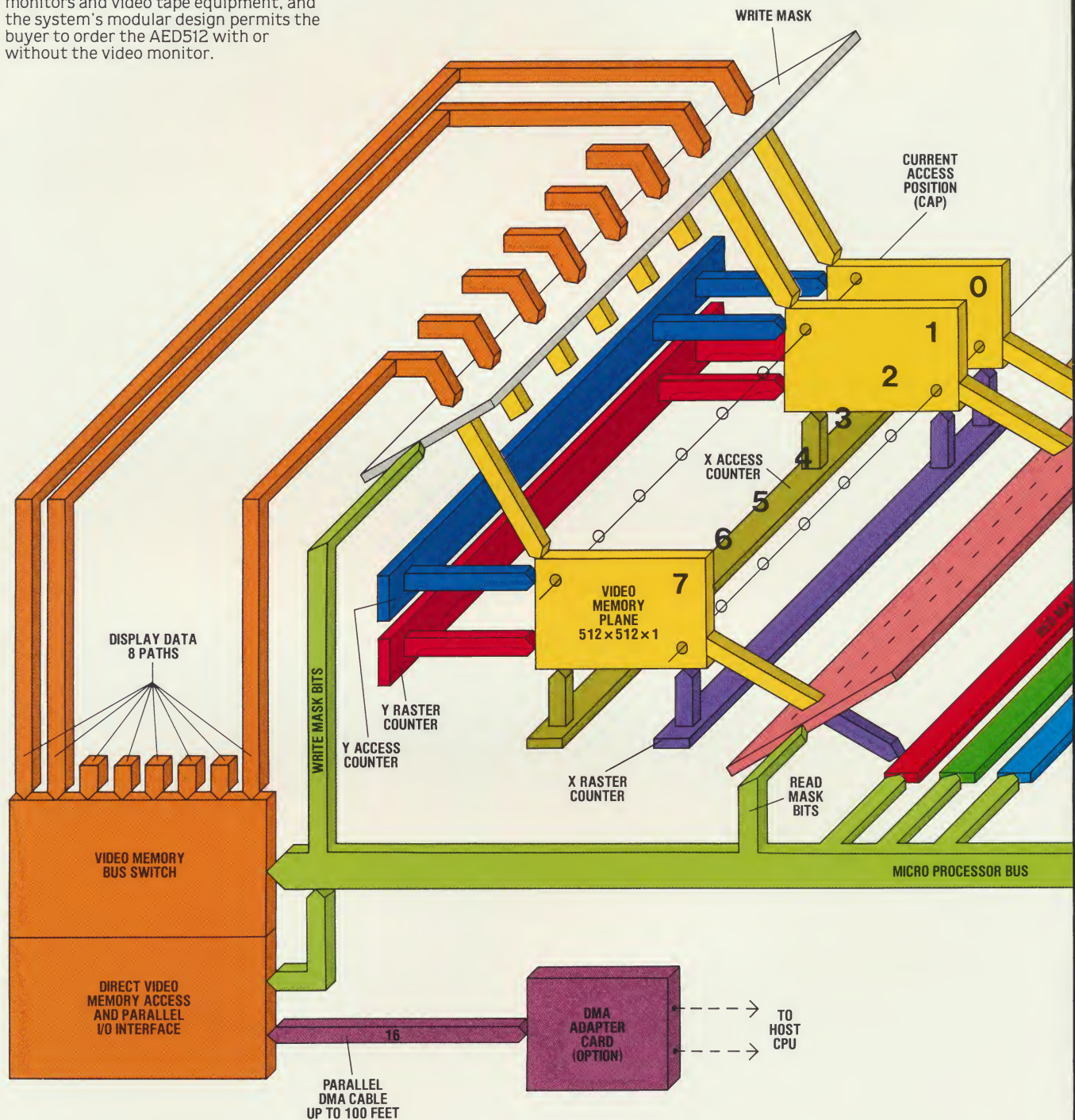
Fig. E

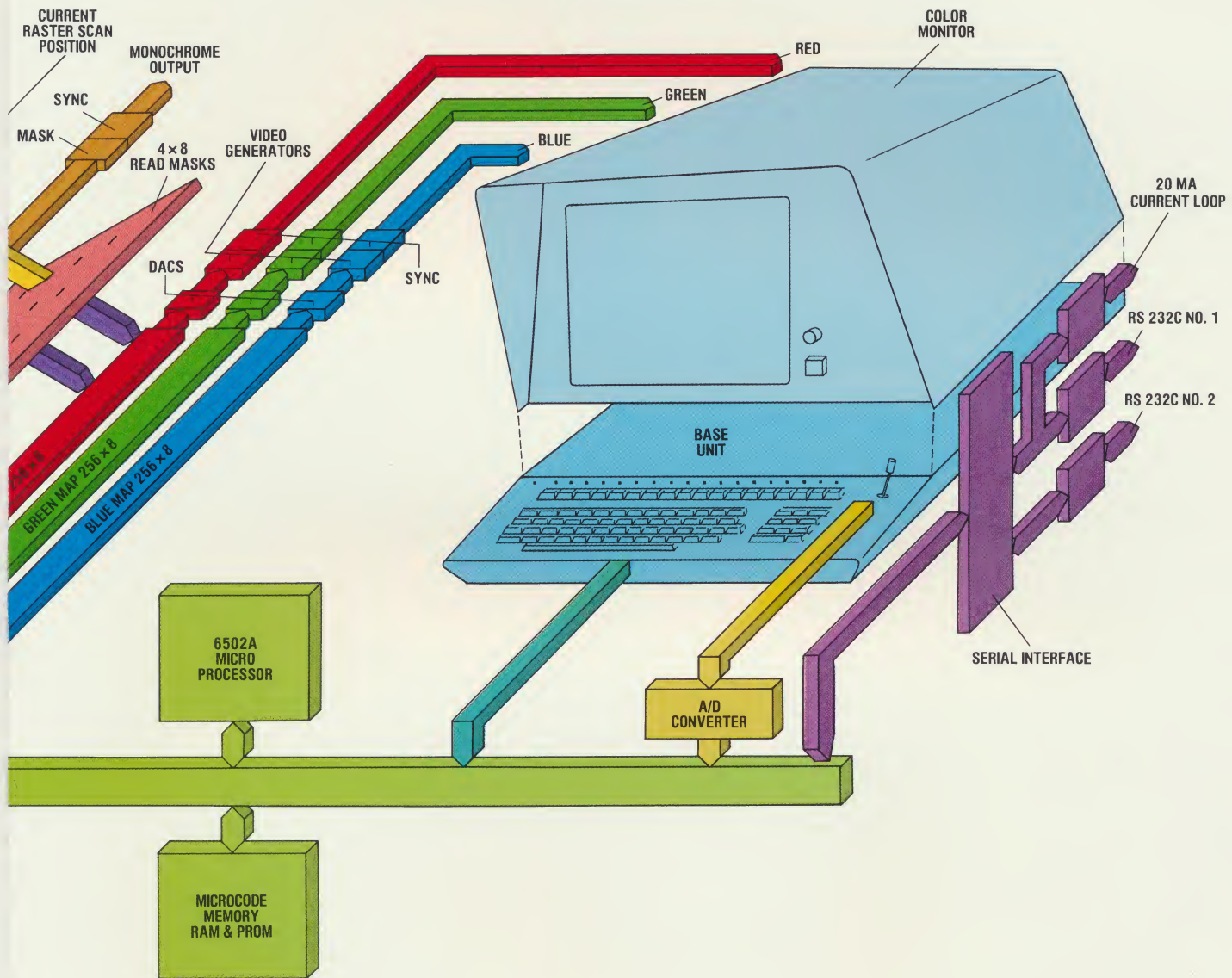
* Reg. trademark of Tektronix, Inc.

IMAGE CREDITS — Figure A: actual photograph of AED512 screen, provided by Comarc Design Systems, Inc., San Francisco, Calif.; Figure B: actual photograph of AED512 screen. Image by Pete Harris of AED and Tom Ferrin of the University of San Francisco, Calif.; Figures C and D: taken with Dunn Instruments (San Francisco, Calif.) camera driven by AED512 from data provided by Jet Propulsion Laboratory of Pasadena, Calif.; Figure E: CAD/CAM program developed by Pete Harris at AED.

System Architecture

Exploded illustration shows the logic, display, and interface components of the AED512. The basic system includes one memory plane (0) with planes 1 through 7 optional. Optional DMA interfaces for higher throughput are available from AED for a variety of popular mini/micro computers. All video outputs drive external monitors and video tape equipment, and the system's modular design permits the buyer to order the AED512 with or without the video monitor.







Introducing the AED512. An intelligent, full-color graphics display system that will add powerful imaging capabilities to your local or remote computer. Besides offering a wide range of DMA interfaces, the AED512 delivers features previously associated only with more costly and much bulkier graphics display systems. Features like half-second image transfer, continuous joystick panning, a full palette of 16.8 million possible hues, and the largest refresh memory of any terminal on the market. With features like this, you'd expect it to be priced much, much higher.

Technical

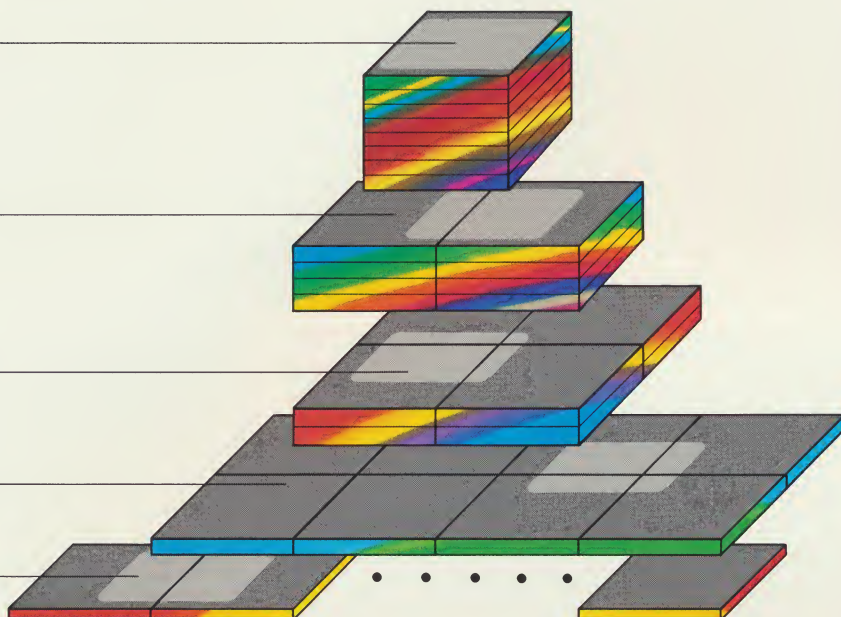
512 HORIZ. PIXELS
512 VERT. PIXELS
256 COLORS

1024 HORIZ. PIXELS
512 VERT. PIXELS
16 COLORS

1024 HORIZ. PIXELS
1024 VERT. PIXELS
4 COLORS

2048 HORIZ. PIXELS
1024 VERT. PIXELS
2 COLORS

4096 HORIZ. PIXELS
512 VERT. PIXELS
2 COLORS



Some of the possible Superoam configurations viewable through 512 x 483 pixel window.

SUPEROAM

Automatic memory-plane switching during scan allows 'roaming' in an expanded image area of up to 1024 x 2048 pixels through a 512 x 483 pixel viewing window. This exclusive Superoam feature permits the user to trade color bits for image area. See diagram for complete selection of alternative viewing modes.

ANIMATION

Dynamically-changing displays can be programmed via color table modification, curve-fill coloring, re-originizing while zoomed, or rapidly erasing and redrawing user-defined symbols. These techniques can be combined to produce effects limited only by the creativity of the user.

EXTERNAL SYNC

An AED 512 exclusive is the capability of gen-locking to external video equipment, offering state-of-the-art computer graphics to television based systems. With the inclusion of video mixers, NTSC encoders/decoders, and/or special effects generators, the user can overlay or switch video from tape, disk, or camera with graphic images from the AED 512.

SAFETY RECOGNITION

Listing anticipated by Underwriters Laboratories 478 standard

POWER (47-63 Hz)

AED 512A — 95 to 132 VAC, 2 Amp.
(excl. monitor)

AED 512B — 190 to 242 VAC, 1 Amp.
(excl. monitor)

EXTERNAL CONNECTIONS

Serial Interface — 25 pin "D"
Parallel Direct Video Memory Access — 50 pin
Scotchflex
Aux. Serial — 25 pin "D"
Red, Green, Blue composite video — BNC
connectors
Monochrome/2-level Hard Copy — UHF
connector
External Sync/Mix — UHF connector

ENVIRONMENT

— 60° to +50°C (storage)
+ 10° to +40°C (operating)
Non-condensing

HUMIDITY

0 to 95% (storage)
0 to 70% (operating)

DIMENSIONS

Including 13 inch color monitor:

Weight 60 lbs
Height 16 inches
Width 22.6 inches
Depth 30 inches

Without monitor:

Weight 25 lbs
Height 3.5 inches
Width 22.6 inches
Depth 30 inches

Software

Fully documented and warranted software is available at modest cost from AED. All functions are FORTRAN-callable and have been stratified for maximum utility in a broad range of applications, from computer-aided design to image processing. All programs have been written in FORTRAN (except input/output primitives in some cases) and can be ordered in their source language form.

Software Packages (from lowest to highest).

TAP (Terminal Access Package) Essentially a Fortran one-to-one with terminal command functions. Provides maximum flexibility.

MIOP* (Multiple Image and Overlay Processor) Allocates video memory and maintains color assignment tables for multiple simultaneous images of differing spatial and color resolution. Supervises image and display update. Allows image "flipping," overlaying, and viewing one picture while generating another.

MEZZO* (Mezzo Machine Package) Transformation to screen coordinates. Clipping. HSV to RGB color transformation. Image enhancement including 2-D Fourier transforms and digital filtering.

AEGRAP* (AED High-level Graphics Package) Tree-structured graphic feature definitions. Interactive display list editing. Display file and image file maintenance for selected operating systems. Three-dimensional coordinate systems.

DRIVERS Device drivers for the AED512 are available for several popular mini/micro computer operating systems, including RT-11, RSX-11M and RDOS.

USER IMPLEMENTED MICROCODE Additional microprocessor code may be down-loaded from the host or programmed into ultra-violet-erasable PROM, giving the user access to the full power of the AED 512 internals in custom applications.

*To be developed

Warranty

The AED512 and its Options are guaranteed to be free from defects in workmanship, materials or design for a period of 90 days from date of invoice. During this warranty period, the buyer ships the malfunctioning part or system to Advanced Electronics Design, Inc., freight collect. We repair it and return it to the buyer freight collect. AED-paid freight costs apply only to the 48 contiguous states and Canada. Outside this area, round-trip freight cost must be paid by the customer.



440 Potrero Ave., Sunnyvale, CA 94086 • Phone 408-733-3555, Telex 357-498
Call AED for the address and phone number of the sales representative nearest you.

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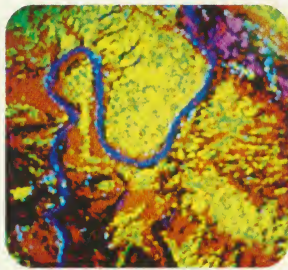


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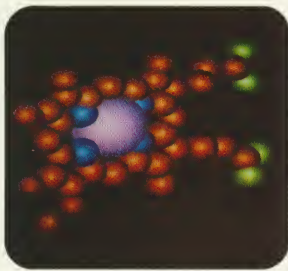


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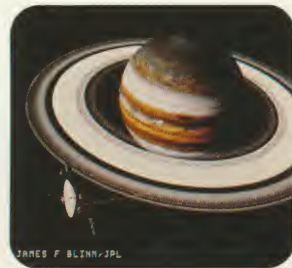


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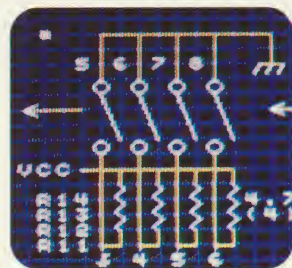


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